Steven Chu: "We need a global carbon price ..."

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Steven Chu, U.S. Secretary of Energy, attended the International Energy Agency (IEA) ministerial meeting on Tuesday October 18th and Wednesday, October 19th, in Paris, where they presented their forecast: the global energy demand will jump 35% by 2035. The fossil fuels - oil, coal and gas - that emit large quantities of CO_2 will remain predominant. It is therefore unlikely to limit warming to 2° C by 2100.Because even though they are promising; investments in clean technologies are still insufficient.

Steven Chu, 63, agreed to clarify to Le Monde the American doctrine regarding these matters. A Nobel Prize winner in Physics in 1997 and the son of Chinese immigrants, Chu was recruited by Barack Obama to "green" the energy policy of the United States.

Even though he manages the largest budget of the stimulus package passed in February 2009, his task has become more difficult since the Republican gained a majority in the Senate. The Republicans have latched on to the example of Solyndra, a Silicon Valley firm that manufactured solar panels, and whose project was the first to have received financial support from the Department of Energy. The company went bankrupt in early September, unable to compete with the highly subsidized Chinese industry.

QUESTION: How do you picture the global energy supply in the coming years? What place will there be for nuclear after the accident in Fukushima?

Nuclear power will continue to play an important role for the next decades. In the U.S., it now provides 20% of our electricity, and I think that this proportion will remain the same in the future.

Regarding Fukushima, I would say that we learn from these types of accidents to make the new reactors safer, especially those of future generations. In terms of security, if you compare the performance of nuclear energy and fossil energy, the atom comes out on top. But I understand that people do not see things like that. Yet, in my view, nuclear power is a clean form of energy.

More broadly, no country wants to depend now on a single source of energy.

That's why many states are looking all over the world to get rid of the influence of oil. Gas is now very competitive with the discovery of new deposits which lower its price. But states will also rely on solar and wind, and always on coal.

You have developed the exploitation of shale gas, seen by some as an El Dorado energy. But the environmental cost is high ...

I think many of us have seen the film *Gasland*. It's hard to say what was true in this documentary and what was not. We have done studies on the controversial technique of hydraulic fracturing. Ultimately, we believe it is possible to use shale gas in an environmentally friendly way on the condition that there is recourse to indisputable professional best-practices. I'm thinking specifically of the double casing used to have perfectly sealed wells that will not contaminate groundwater, the banning of diesel that some unscrupulous companies continue to use as a lubricant, etc. We are working on a regulatory framework that would require operators to be more transparent and communicate the list of chemicals used in fracturing of the rock. Yes, I believe that shale gas is an energy future that we can use responsibly.

Does solar energy still have a role to play despite the turmoil it is going through, as evidenced by the Solyndra case?

From the 1990s until mid-2009, the price of solar modules fell by 3.5% per year. Since then, prices have plummeted. For two reasons: a supply - subsidized – much higher than the demand, even if that demand is increasing, and the emergence of new highly automated factories in China, which has become the largest producer, the largest exporter, and the largest user of solar energy in the world.

The Chinese want to diversify their energy supply, which is very dependent on coal. They are now measuring the environmental damage of their energy use, because today they are serious about the climate issue. So I'll bet that by 2020, the price per kilowatt hour of solar energy produced will significantly decrease. And that energy will become as competitive as others, including in terms of storage. I think that within the next ten years solar will have a large global market, driven by strong demand.

But concerning the solar market, is there room for other players besides China?

There is no question of us giving up. That is not the right attitude. Solar needs

highly diversified technologies to become more efficient and less expensive. There are many elements which can improve efficiency. Thus, the need for highly integrated electronics provides opportunities for industries other than those in China.

The United States also has an ambitious plan for the development of bio-fuels. What are the guiding principles?

Biofuels are a piece of a broader strategy for transportation. We would first improve the energy efficiency of vehicles. Between 60% and 65% of our oil consumption is swallowed up in cars and light trucks. We also need to develop electric vehicles. We are moving a lot in terms of price and of the quality of batteries available.

The second-generation biofuels made from agricultural and forest waste are a third area of development. But competitiveness is still too low compared to that of oil. Hence an ambitious research program is needed to make them viable without the support of grants.

Their production raises the question of the change of land use in a world where it is increasingly difficult to feed seven billion people.

There should not be any competition between fuel and food. But everything depends on the land you're speaking of. We are thus opposed to the destruction of old-growth forests to produce biofuel crops. But all over the world there exist non-irrigated "marginal lands" which can be used for biofuel plantations.

The introduction of systems for capturing and storing CO2 has not been as quick as expected. Are you concerned about it?

We absolutely need to succeed at capturing and permanently storing carbon. By not moving in this direction we run a high risk environmentally. It is now clear that this technique is very expensive and needs billions of dollars of investment, hence the lag that you are alluding to.

That's why there should be a global carbon price. Without a substantial price attached to CO_2, businesses and energy producers will continue to debate whether to make such investments.

How will you pursue a green agenda now that the Republicans hold the

Senate?

President Obama has chosen to follow this path. We will do everything we can to get there. Some members of Congress do not think like us. However, we still have substantial resources such as the research budget. Let’s move forward instead of rehashing the same old things, the same technologies. The 1940s are long gone. Our habits must change.

Interview by Bertrand d'Armagnac and Marie-Béatrice Baudet